



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/583,854

06/21/2006

Takuya Tsukagoshi

128481

8602

25944 7590 05/12/2008

OLIFF & BERRIDGE, PLC

P.O. BOX 320850

ALEXANDRIA, VA 22320-4850

EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

MAIL DATE

DELIVERY MODE

05/12/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,854	<b>Applicant(s)</b> TSUKAGOSHI ET AL.	
	<b>Examiner</b> Audrey Y. Chang	<b>Art Unit</b> 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/21/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's preliminary amendment filed on June 21, 2006, which has been entered into the file.
- By this amendment, the applicant has amended claims 5, 7, and 10, and has newly added claims 13-20.
- Claims 1-20 remain pending in this application.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1-20 recite that the accessing method for accessing the data blocks based on layer number, number assigned to data pages and number assigned to data blocks. The specification and claims fail to teach how could by simply using these assigned numbers the data blocks can be accessed. In order to access holographic data blocks, **certain reproduction beam** needs to illuminate the holographic recording medium with the data blocks recorded and at the location of the medium with the desired data block located. Simply having these assignment numbers will not be able to access the data blocks.

***Claim Objections***

**3. Claims 1-20 are objected to because of the following informalities:**

(1). Claim 1 recites that the “data pages ... for recording data are angle-multiplex-recorded in respective holographic recording layers” and claim 2 recites “data pages are shift-multiplex-recorded”. It is not clear the angle-multiplex recordation of the data pages are between each page in the same recording layer or in different recording layers. Also it is not clear how does the shift multiplex recordation relate to the angle-multiplex recordation.

(2). It is not clear the number assigned to the data blocks, referring to the row number and column number, is respect to each data page or a plurality of data pages. If it is the later then how does the row and column be defined? Claims 3 and 4 make the number assignment not clear.

(3). The phrase “the data pages are read out on row-by-row basis by means of the imaging device” recited in claim 6 is confusing. What is this "row-by-row" referred to? It is not clear the row of what?

(3). The phrase "simultaneously reading a plurality of the data page which is angle-multiplex-recorded in the same recording area" recited in claims 7, 8, 9, 16, 17 and 18 is confusing and indefinite. Again it is not clear how are these data pages are "angle-multiplex" recorded. Within the same layers, different layers or at the same recording area? If they are at the same area then each recording layers has only one area for the recordation. If they are recorded in different layers then they are not at the same recording area? Please specify the structural and logical relationships to make it clear. Also it is not clear how does the "simultaneous reading process” come about?

**Appropriate correction is required.**

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1, 3, 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Goulanian et al (PN. 7,321, 540) in view of the patent issued to Spitz et al (PN. 4,052,706).**

**Goulanian et al** teaches a *multilayer holographic data storage* with data accessing method included wherein a *plurality of data pages* having *data blocks structure* as shown in Figure 3 is recorded in a multilayer structure of holographic storage medium having *a plurality of recording layers* (11<sub>i</sub>, Figure 1a, with "i" being the identifier for the layer number). The data pages can be *angle multiplexed* recorded in each recording layers, (please see Figure 1a and 16, column 8, lines 5-14 for the angle multiplexing method). The multilayer structure of the recording layers is formed by laminating the recording layers as shown in Figure 1a. Goulanian et al teaches that while accessing the data recorded, a *layer and row accessing unit* (30, Figure 5, column 5, lines 1-8) is used to access the data according to specified layer and data page at the specified row. Goulanian et al teaches that each recording layer is identified by symbol "i" that serves as *the layer number* and hologram for each data page on the recording layer is identified by *row index "j"* and *index "k"* that serve as *number assigned to the data page*. The hologram is therefore identified as 14<sub>ijk</sub>, that is specified by layer number and data page number. And the accessing method via the layer and row accessing unit is based on the identifiers stated above.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the data blocks contained in each data page is further identified by a number assigned to the blocks and the block of the data can be accessed via the assigned block number. **Spitz et al** in the same

Art Unit: 2872

field of endeavor teaches *a data page* including a plurality of data blocks (9 data blocks as shown in Figure 2) that each data block can be accessed. The data blocks in each page can certainly be identified by a number for indicating row and column location of the block. It would then have been obvious to one skilled in the art to apply the teachings of Spitz et al to further identify the data blocks of each data page of Goulanian et al (as shown in Figure 3) by number assigned to individual block with column and row indicators to further access the data blocks of each data page in the holographic storage medium for the benefit of allowing individual data block be accessed and read.

With regard to claim 3, the number for specifying the data blocks has to include a row number and column number since the data blocks (as shown in Figure 3 of Goulanian et al and Figure 2 of Spitz et al) are arranged in two dimensional matrix with rows and columns.

With regard to claims 10 and 20, Goulanian et al teaches that the data accessing process involves successively accessing each data page with the layer and row accessing unit (30). The holographic recording layer can be changed for the accessing process.

**6. Claims 2, 4 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Goulanian et al and Spitz et al as applied to claim 1 above, and further in view of the patent issued to Jeganathan et al (PN. 5,844,700).**

The multilayer holographic data storage with data accessing method taught by Goulanian et al in combination with the teachings of Spitz et al as described for claim 1 above have met all the limitations of the claims.

These references however do not teach explicitly about recording the data page by shift multiplex recording. However shift multiplexing method is one of standard multiplexing methods known in the art to increase the recording density of hologram. As explicitly demonstrated by Jeganathan et al that by combining spatial or shift multiplexing and angle multiplexing, the recording density of hologram would

Art Unit: 2872

increase sharply due to the partial overlapping of the recorded hologram data, (please see Figure 1B). it would then have been obvious to one skilled in the art to apply the teachings of Jeganathan et al to record the data pages also with shift or spatial multiplexing method to increase the density of recording sharply.

With regard to claim 4, the number for specifying the data blocks has to include a row number and column number since the data blocks (as shown in Figure 3 of Goulanian et al and Figure 2 of Spitz et al) are arranged in two dimensional matrix with rows and columns.

With regard to claim 19, Goulanian et al teaches that the data accessing process involves successively accessing each data page with the layer and row accessing unit (30). The holographic recording layer can be changed for the accessing process.

**7. Claims 5-9, 11-12, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Goulanian et al and Spitz et al as applied to claims 1 and 3 above, and further in view of the patent issued to Meyrules et al (PN. 7,200,097).**

The multilayer holographic data storage with data accessing method taught by Goulanian et al in combination with the teachings of Spitz et al as described for claims 1 and 3 above have met all the limitations of the claims.

With regard claims 5 and 14, Goulanian et al teaches that the reproduced holographic data, according to layer and rows are received and detected by photodetector array (50, Figure 5) but it does not teach explicitly that the layer number of the recording layer is identified by number assigned to each of two-dimensional optical detectors such that each of the detectors is provided for a respective one of the holographic recording layer. However whether to have specific photodetector for specific recording layer or not, does not affect the function of having photodetector array to detect the reproduced holographic data according to each recording layer. Meyrules et al in the same field of endeavor teaches a angle multiplex recorded holograms in recording medium wherein each reproduced data page is detected by an

Art Unit: 2872

independent detector (CCD) as shown in Figure 4. It would have been obvious to one skilled in the art to modify the arrangement of the photodetector array (50) of Goulanian et al to arrange them so that the detector is identified with the specific recording layer to make the detected holographic data with better identification and organization.

With regard to claim 6, it is implicitly true that the photodetector array (50) of Goulanian et al has same two dimensional arrangement with the arrangement of data pages in order to receive the reproduced data from each pages row-by-row, (please see Figure 5). Although this reference does not teach explicitly that the photodetector array are comprised of imaging devices, but as shown by Meyrules et al CCD or charge couple device, which is an imaging device, is a well known photodetector. It would then have been obvious to one skilled in the art to use a standard CCD as the photodetector.

With regard to claims 7-9, 11-12, and 17, Goulanian et al teaches that the data accessing process involves successively accessing each data page with the layer and row accessing unit (30). The holographic recording layer can be changed for the accessing process. However it does not teach explicitly that a process of simultaneously reading a plurality of data pages. **Meyrules** et al teaches the data pages may also be recorded in angle multiplexing scheme disclosed such that a single reference beam (410, Figure 4) is used to simultaneously read out a plurality of data pages recorded, (please see Figure 4). It would then have been obvious to one skilled in the art to apply the teachings of Meyrules et al to modify the recording so that a plurality of data pages can be simultaneously retrieved as an alternative way of recording to provide option for simultaneously reading out data.

**8. Claims 13, 15, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Goulanian et al, Spitz et al and Jeganathan et al as applied to claim 2 above, and further in view of the patent issued to Meyrules et al (PN. 7,200,097).**



The multilayer holographic data storage with data accessing method taught by Goulanian et al in combination with the teachings of Spitz et al and Jeganathan et al as described for claim 2 above have met all the limitations of the claims.

With regard claims 13 and 15, Goulanian et al teaches that the reproduced holographic data, according to layer and rows are received and detected by photodetector array (50, Figure 5) but it does not teach explicitly that the layer number of the recording layer is identified by number assigned to each of two-dimensional optical detectors such that each of the detectors is provided for a respective one of the holographic recording layer. However whether to have specific photodetector for specific recording layer or not, does not affect the function of having photodetector array to detect the reproduced holographic data according to each recording layer. Meyrules et al in the same field of endeavor teaches a angle multiplex recorded holograms in recording medium wherein each reproduced data page is detected by an independent detector (CCD) as shown in Figure 4. It would have been obvious to one skilled in the art to modify the arrangement of the photodetector array (50) of Goulanian et al to arrange them so that the detector is identified with the specific recording layer to make the detected holographic data with better identification and organization.

With regard to claims 16 and 18, Goulanian et al teaches that the data accessing process involves successively accessing each data page with the layer and row accessing unit (30). The holographic recording layer can be changed for the accessing process. However it does not teach explicitly that a process of simultaneously reading a plurality of data pages. **Meyrules** et al teaches the data pages may also be recorded in angle multiplexing scheme disclosed such that a single reference beam (410, Figure 4) is used to simultaneously read out a plurality of data pages recorded, (please see Figure 4). It would then have been obvious to one skilled in the art to apply the teachings of Meyrules et al to modify the recording so that a plurality of data pages can be simultaneously retrieved as an alternative way of recording to provide option for simultaneously reading out data.

Art Unit: 2872

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

***Audrey Y. Chang, Ph.D.***  
***Primary Examiner***  
***Art Unit 2872***

A. Chang, Ph.D.  
/Audrey Y. Chang/  
Primary Examiner, Art Unit 2872